

IONIZATION PROPERTIES OF MOLECULES COMMONLY USED FOR PLASMA PROCESSING OF SEMI-CONDUCTORS

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Two types of processes are involved in plasma processing of semi-conductors. They are: plasma etching or cleaning and plasma deposition of the semi-conducting materials. For plasma etching of semi-conductors mostly halogen containing gases are used as additives to gases such as O₂ and N₂. For plasma deposition gases such as C₂H₂, SiH₄, Si₂H₆ have been used in the past. For an optimal performance of a reactor it is important to model the plasma. In this modeling effort electron impact excitation and ionization cross sections play a central role. For ionization balance calculations values of ionization cross sections are needed. Ion molecule reactions determine the ultimate composition of the plasma. Recently it has been discovered that the by products of many of these plasmas are per fluoro hydrocarbons (PFCs) which are highly infrared absorbing species and have long life times in the atmosphere. They cause global warming. A lot of research is being pursued at the present time to find alternative molecules which do not produce global warming gases as the end product of the plasma processing reactor. There is also interest in the ionization and dissociative ionization properties of these molecules from the point view of the plasma abatement of the pollutant gases at the exhaust of the semi-conductor processing reactors. At the conference ionization and dissociative ionization properties of some of these molecules will be presented.

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